ATOMIC ENERGY Letter

THE FIRST AND ONLY

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Dear Sir:

With almost complete agreement last week by Senate and House on the new atomic energy bill (certain patent provisions were yet to be thrashed out), industry in the United States is shortly to have far greater opportunities in the nuclear energy field. Specific provisions of the act provide that: (a) The use of radio-isotopes by industry is to have less regulation than previously. (b) Private groups may construct and operate nuclear power plants, and obtain "fuel" from the USAEC. While licenses, construction permits, etc., must, of course, be obtained from the USAEC for such operations, this is a wholly new right that previously had been entirely forbidden to private organizations or individuals. (c) Nuclear material may now be produced and used (under USAEC license) by private companies. While title to such material will be in the Federal government, these rights had been prohibited under the 1946 act. (d) Restricted nuclear information will be given to non-government people under a new classification set-up. This will permit information to be given to those with different security clearances on the basis of such clearances, i. e., the higher the clearance, the less restraint that will be necessary. (e) Nuclear materials and the facilities of the USAEC may be used for research or medical therapy by private firms, research organizations, foundations, etc., with but a small degree of regulation, by the USAEC. Under present law, this could be done only if the USAEC sponsored the work or let a contract for it. (f) The USAEC will furnish private firms with fissionable material to conduct nuclear research (under license granted by the USAEC). (g) Nuclear reactors, for either power production or experimental purposes, may now be exported, under license of the USAEC; this had been a specific prohibition of the 1946 act.

A session on Nuclear Radiation Instrumentation, at the Instrument Society of America's first international congress and exposition (Philadelphia Sept. 13-24, 1954) will hear papers on The Measurement of Radioactivity in Food and Water During an Emergency (O. G. Landsverk); Self-Indicating Dosimeter in Civil Defense (C. R. Siebentritt, Jr.); Applicability of Chemical Dosimeter in Civil Defense (G. V. Taplin, M.D.); Radiophotoluminescent Glass Dosimeter as a Civil Defense Instrument (J. H. Schulman); Evaluation Tests of Radiological Instruments (S. W. Smith); Requirements of Radiation Instrument Industry in National Emergency (L. J. Dean); and Radiation Slide Rules in Civil Defense (K. Wade).

A program of some 19 papers has now been selected for the first national annual meeting of the Professional Group on Nuclear Science of the Institute of Radio Engineers. The two day meeting, Oct. 6-7, 1954, in Chicago, will hear reports on Accelerators and Nuclear Reactors from speakers in this country and Great Britain; reports on Instrumentation; a discussion of Foreign Reactor Technology in Norway, Sweden, Great Britain, and Canada; and reports on American Accelerator and Nuclear Reactor Technology. This last session will hear Lyle B. Borst talk on Steps Toward an Atomic Industry.

Subscription rates: United States, U.S. possessions, and Canada, $18.00 a year. Latin America, $20.00 a year. All other countries, $25.00 a year.

BUSINESS NEWS...in the nuclear field...

GAINS SHOWN BY MUTUAL FUND:- Continued interest by the investing public in Atomic Development Mutual Fund, Inc., had brought the fund's net assets to some $3.6 million on the first of this month (August). Holdings of the Fund, which is an open-end investment trust, had shown some $90,000 in unrealized appreciation at the end of the Fund's fiscal year June 30th, 1954. Using the services of Nuclear Development Associates, Inc. (White Plains, N.Y.) as technical adviser, and Auchincloss, Parker & Redpath (Washington, D.C.) as investment adviser, the Fund's portfolio of firms prominent in the nuclear field reveals the increasing industrial participation in nuclear energy of United States firms. Of interest are investments of the Fund in firms engaged in diversified atomic activities. It is in this category, which comprises four firms, General Electric, Union Carbide & Carbon, Vitro Corporation, and Westinghouse Electric, that the largest capital gains have been made by the Fund. Greatest appreciation has been shown by Vitro Corporation of America. In other categories of the Fund's holdings (application of atomic power; USAEC operating contractors; suppliers of special equipment; radioactive materials and radiation instruments; and raw materials) gains were registered as well in every case.

NEW REPORTS OF INDUSTRIAL INTEREST AVAILABLE:- A new compilation now made by the USAEC lists and abstracts current USAEC unclassified reports of interest to industry. Obtainable (as "Nuclear Notes for Industry, No. 3") from the USAEC's technical information section, Oak Ridge, the notes include 13 reports in chemistry and chemical engineering; 4 in electronics and electrical engineering; 7 in health and safety; 7 in mechanics and mechanical engineering; 10 in metallurgy and ceramics; and 6 in nuclear technology.

NEW PRODUCTS, PROCESSES & INSTRUMENTS...for nuclear lab & plant...

FROM THE MANUFACTURERS:- Model SC-12 liquid sample attachment; for counting very low level gamma activity in small volume liquid samples (up to 5 cc.). When used in conjunction with this manufacturer's LH-6 shield, the background is reduced to approximately 200 counts per minute, with a sensitivity of 1000 counts per minute for one millimicrocurie of iodine-131. The estimated efficiency for a small sample of iodine-131 is 50% of all gamma rays emitted.--Nuclear Research & Development, Inc., St. Louis 14, Mo.

Model 312 high voltage supply; for precision scintillation counting. Said to have a high degree of regulation, and to be stable to approximately 0.02% per day with drift minimized practically to the point of elimination. A special feature of this supply is a positive or negative output through the same connector, controlled by a front panel switch. This switch also allows the high voltage to be removed from the connector without turning off the supply. Maximum current output is rated at 1-milliamp. Line regulation is 0.01% for a line change from 100-v. to 130-v.--Atomic Instrument Co., Cambridge 39, Mass.

NOTES:- In a joint project of General Electric Co.'s silicone products department, and Abbott Laboratories, radioactive silicones have now been made available for medical research and industrial use. According to Abbott Laboratories officials, radioactive silicone fluids are made readily measurable in minute amounts by the incorporation of carbon-14. It is felt that radioactive silicones may prove a research tool of value in pharmacy, cosmetics, textiles, and other areas. Further information on the radioactive silicones may be obtained from Dr. Donalee L. Tabern, who heads up Abbott Laboratories' Department of Radioactive Pharmaceuticals, North Chicago, Ill. The standard authorization from the USAEC must be obtained by organizations or persons interested in ordering radioactive silicones from Abbott Laboratories.

A ceramic coating material of extremely low thermal neutron absorption coefficient has now been developed by the National Bureau of Standards to meet the increasing demand for high-temperature protection of alloys in nuclear reactors. Most promising of the materials investigated are boron-free coatings of the frit-refractory type in which a high-barium frit is combined with ceria-chromic oxides. These coatings have withstood temperatures in excess of the 1000 deg. C. found in nuclear reactors.

ATOMIC ENERGY PROGRESS IN THE UNITED STATES: January-June 1954. A condensation prepared for this LETTER from the 16th semi-annual report of the USAEC, July 30th, 1954.

RAW MATERIALS:- Domestic-Uranium ores and concentrates were produced in record amounts in the United States in the past 6-months. By May 1st, 1954, some 430 mining operators were producing and delivering uranium ore from 530 mines in the United States. The Colorado Plateau was the most important source of this domestic uranium production, with nearly all the large ore bodies discovered in the past 2-years being located in this area. Under the terms of the USAEC's Circular 6 (which pays a bonus for the production of the initial 10,000 pounds of uranium oxide contained in ore produced from certain eligible uranium mines on the Plateau) over $3,600,000 has been paid out in bonus awards. Payments were made to 379 certified mining properties, with some 64 properties receiving full benefits under the circular.

Foreign- An important source of uranium for the United States continued to be the Shinkolobwe mine in the Belgian Congo. In Canada, production and deliveries of uranium to the USAEC from the Canadian-Government-owned Eldorado mine on Great Bear Lake continued. Uranium receipts by the USAEC from South Africa reached important proportions since the start of production in October, 1952. The sixth plant to recover uranium on the Witwatersrand started operations in February (Randfontein Estates Gold Mining Co.). In South Australia, construction of the Port Pirie ore concentrator to treat ore from Radium Hill is expected to be completed late in 1954. Another uranium deposit in this region at Myponga, in the Adelaide Hills, 35 miles south of Adelaide, is being explored.

FISSIONABLE MATERIALS PRODUCTION:- Productiono f fissionable materials sharply increased during the first 6 months of 1954, chiefly because of the startup of new plant capacity and the increased amount of raw materials available. The $1.5 billion Savannah River project (operated by du Pont) in South Carolina neared completion, and a number of its components were placed in operation. At Hanford, Wash., construction of additional nuclear capacity continued. The first gaseous diffusion plant (producing uranium-235) at Paducah, Ky., went into full operation, as well as portions of the second plant there. At Oak Ridge, the addition to the gaseous diffusion plant there is now partially completed, while construction of the new plant at Portsmouth, Ohio, continues at an accelerated pace. The atomic weapons stockpile of the United States continued to grow rapidly in total numbers, with a trend toward an increased variety and versatility of these weapons. The development of a "family of weapons" by the USAEC has extended the military usefulness of available fissionable material. Meanwhile, paralleling fission weapon development, there is in progress a concerted development effort on thermonuclear weapons. Important advances have been made in both fission and thermonuclear weapon development.

RADIATION INSTRUMENTS & THE USAEC:- An accounting study was recently completed by the USAEC covering its costs and investment in radiation instrumentation. The study showed that during the fiscal year 1953, the USAEC spent nearly $10 million on radiation instruments, while the inventory which it carried of radiation instruments totaled nearly $13 million. An analysis of the costs and investment incurred breaks down as follows: Fabrication of instruments by USAEC and/or its contractors: 6%. Purchases from commercial sources: 28%. Repairs and maintenance of instruments: 22%. Research and development: 44%. Thus, purchases from commercial sources were nearly five times the amount spent on fabrication of instruments within the USAEC.

MANPOWER:- In March, 1954, scientific and engineering staff of the USAEC and its operating contractors totaled some 13,612 persons. Of this total, the largest group comprised 2,411 chemists, followed by 1,843 mechanical engineers. There were 1,708 physicists, and 738 other physical scientists; 1,634 chemical engineers; 1,617 biological and medical scientists; 1,346 electrical engineers; 408 metallurgical engineers; and 1,907 engineers not fitting in the above categories.

Operating employees of the USAEC and its contractors in this same month (March) totaled 72,316 persons. Current forecasts are that operating employment will increase at the rate of 750 per month during the ensuing 12-months, and slower thereafter, until it levels off at about 82,000 in mid-1956.

ATOMIC ENERGY PROGRESS IN THE UNITED STATES: January-June 1954. (Cont'd)

NUCLEAR REACTOR POWER DEVELOPMENT:- Commercial Power-There was developed a specific program of research and development to decrease the cost of nuclear power. The program provides for development of 5 distinct technological approaches, with experimental reactor power plants costing nearly $200 million.

These 5 approaches are: (1) Pressurized water reactor, estimated to cost $85 million, and to be completed by 1957. Moderated and cooled by water, this reactor is now under development by Westinghouse Electric Co. It will be utilized in the United State's first nuclear power plant, to be built by Duquesne Light Co. at Shippingport, Pa., and is expected to have an output of at least 60,000 kw. of useful electrical energy. (2) Boiling water reactor, estimated to cost $17 million, with completion expected in 1956. This reactor is relatively economical for power production since it may be used as a direct source of steam in such a plant. Capital costs can also be reduced, under such operation, by eliminating the steam boiler outside the reactor, by reducing the pressure of the primary coolant system, and the pumping power required by the system. Argonne National Laboratory bears the responsibility for this reactor which will use normal uranium fuel plus enriched uranium-235 and which will be moderated and cooled by ordinary water. An important aspect of tests that will be conducted with this reactor will be to determine whether it can be operated without troublesome or hazardous deposit of radioactivity in the turbine, feedwater pumps, condenser, or other equipment outside the reactor. (3) Sodium graphite reactor, with cost estimated at $10 million and completion date set at 1955. North American Aviation, Inc., is the contractor exploring this approach to commercial power; the reactor North American will develop, construct and build is expected to produce 20,000 kw. of heat energy. (4) Homogeneous reactor, cost of which is estimated at $47 million, and completion date estimated for 1956-58. Known as homogeneous reactor experiment no. 2, this will be the second project in this field undertaken by Oak Ridge National Laboratory. With a heat output of 5,000 kw., the primary purpose of HRE No. 2 is to produce a simplified, mechanically reliable plant demonstrating operability and reliability over a long period under conditions closely simulating those of a full-scale reactor. Information obtained from the HRE, and other investigations will be applied to the design of a homogeneous thorium reactor now in the planning stage at Oak Ridge. The HTR is to produce about 65,000 kw. of heat, of which some 16,000 kw. will be converted into electrical energy. (5) Breeder reactor, estimated to cost $40 million, and expected to be completed in 1958. After two years of experience by Argonne National Laboratory with an experimental breeder reactor (no.1), a much larger unit (no.2) is now to be built, with many features of a full-scale power plant. EBR no.2 is planned as a scale-up to 62,500 kw. in heat power, and 15,000 kw. in electrical energy. (EBR no. 1 supplied 1,400 kw. of heat, and 170 kw. of electrical energy.) EBR no. 2 will closely resemble a large central station power breeder in power, control, fuel handling, and other features. Much of the equipment for a full-scale power plant will also be used--pumps, heat exchangers, valves, flow meters, etc. Plutonium will be used as fuel for EBR no. 2.

Other nuclear power projects include a joint USAEC-U. S. Army "package" power plant, with the prototype that will be constructed being built on a conceptual engineering design of a pressurized light water reactor by Oak Ridge National Laboratory. Additionally, submarine and aircraft reactors were under construction and/or test; principal contractors are Westinghouse Electric, General Electric, and United Aircraft Corp.

INVESTMENTS & BUSINESS PARTICIPATION:- Costs incurred for new plant and equipment for the USAEC averaged about $106 million per month during the first half of 1954. Monthly costs for the current USAEC construction program reached a peak this past June, when they reached (approximately) $120 million. It is estimated that monthly construction costs will decline during the next six months and average approximately $107 million for the calendar year 1954.

Small business participation in USAEC procurement was through sub-contracts from the prime cost-plus-fixed-fee USAEC contractors, since only 3% in direct contract awards have been made to small business concerns by the USAEC from July, 1951 --March, 1954. In this period, small business received 40% of the sub-contracts awarded by prime cost-plus USAEC contractors.

ATOMIC PATENT DIGEST...latest U. S. grants in the nuclear field...

Container for radioactive material. Comprises (in part) a body including a block of material impervious to radiations from the radioactive material, this block having a cavity to hold the radioactive material. An opening into this cavity permits directionally-controlled exposure of the radioactive material, while a removable plus is used to close the opening. U. S. Pat. No. 2,684,447 issued July 20th, 1954 to Ernest Norman Gilks, Belbroughton, England.

Vibration isolating means. Comprises (in part) a cradle to support an object, with springs furnishing support for the cradle. Several rigid extensions on the cradle have annular rubber members which cooperate with the spring means in supporting the cradle and minimizing its vibration. U. S. Pat. No. 2,684,825 issued July 27th, 1954; assigned to United States of America (USAEC). (Inventors: D. W. Laviana, E. K. Arnold, and G. L. Cooper.)

Radioactivity measurement; apparatus for periodically activating and deactivating an electronic device at preset time intervals. Comprises (in part) a source of periodic voltage pulses, two electronic scalers of identical scaling ratios, an electronic switching circuit, means to impress these periodic voltage pulses on the inputs to both of these scalers, with appropriate circuitry to alternately activate and deactivate such electronic device as the output signals of the scaler are impressed upon. U. S. Pat. No. 2,685,027 issued July 27th, 1954; assigned to United States of America (USAEC). (Inventor: Luis W. Alvarez.)

Method of determining the depth of penetration of projectiles into a sub-surface area surrounding a well bore. Comprises (in part) depositing several projectiles each having identical radioactive radiation emitting qualities into the sub-surface area at different elevations, moving an instrument responsive to radioactive radiations within the well bore, and maintaining the instrument in the same position in a vertical plane within the bore throughout its movement. The instrument is used to measure the intensity of the radiations emanating from each projectile, the intensity being a measure of the depth of penetration of the projectile. U. S. Pat. No. 2,685,038 issued July 27th, 1954, to Robert L. Hoss, Corpus Christi, Texas.

Process for preparing boron. The method of preparing elemental boron in high density form which comprises (in part) forming a fine dispersion of molten alkali metal in gaseous boron halide, and reacting the dispersed alkali metal with the boron halide. U. S. Pat. No. 2,685,501 issued August 3rd, 1954; assigned to United States of America (USEC). (Inventor: Jerome S. Spevack.)

Method for reducing the permeability of an alloy by hydrogen. Comprises (in part) heating the alloy in an atmosphere consisting essentially of hydrogen at a temperature of not less than about 600 deg. C. for a period of time not less than about 24-hours, this alloy comprising iron, nickel, and chromium. U. S. Pat. No. 2,658,546 issued August 3rd, 1954; assigned to United States of America (USAEC). (Inventor: Thomas R. P. Gibb, Jr.)

Thermocouple vacuum gauge. Comprises (in part) a control circuit with sensing means for producing a variable direct voltage in response to changes in value of a physical condition, and means for applying this variable voltage to the input terminals of a converter circuit and additional electronic circuitry. U. S. Pat. No. 2,685,665 issued August 3rd, 1954; assigned to United States of America (USAEC). (Inventor: George W. Price.)

Speed regulating circuit for generators; apparatus for maintaining an alternator substantially at a predetermined speed. Comprises (in part) means connected to the alternator to provide a voltage having a phase opposed to the phase of the alternator voltage, a resonant circuit, including an inductance and a capacitance, with the circuit being resonant at the predetermined speed. The circuit is adapted to provide a voltage having an instantaneous phase shift relative to the alternator voltage when the alternator speed varies from the desired value. U. S. Pat. No. 2,685,671 issued August 3rd, 1954; assigned to United States of America (USAEC). (Inventor: M. W. Horrell.)

Sincerely,

The Staff,
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